IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant:	McCormack	Examiner:	Nguyen, J.
Serial No.:	09/932,085	Group Art Unit:	2673
Filed:	August 17, 2001	Docket No.:	NL 000460
Title:	Matrix Display Driver With Energy Recovery		

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence and the papers, as described hereinabove, are being deposited in the United States Postal Service, as first class mail, in an envelope addressed to: Board of Patent Appeals and Interferences, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450, on October 12, 2004.

By: Erin M. Nichols
Erin M. Nichols

APPEAL BRIEF

Board of Patent Appeals and Interferences
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an Appeal Brief submitted pursuant to 37 C.F.R. § 41.37 for the above-referenced patent application. Please charge Deposit Account No. 50-0996 (PENA.031PA) in the amount of $340 for this brief in support of appeal as indicated in 37 C.F.R. § 41.20(b)(2). If necessary, authority is given to charge/credit deposit account 50-0996 (PENA.031PA) any additional fees/overages in support of this filing.

I. Real Party in Interest

The real party in interest is Koninklijke Philips Electronics N.V., having an office and place of business at Groenewoudseweg 1, NL-5621 BA Eindhoven, Netherlands. The above-referenced patent application is assigned to Koninklijke Philips Electronics N.V.

II. Related Appeals and Interferences

Appellant is unaware of any related appeals, interferences or judicial proceedings.

III. Status of Claims

Claims 1-9 are presented for appeal. Claims 1-9 are rejected and claims 10-12, added in the Amendment and Response After Final Action filed on May 24, 2004, have not been entered. The pending claims under appeal, as presently amended, may be found in the attached Appendix of Appealed Claims.

IV. Status of Amendments

The Amendment and Response After Final Action filed on May 24, 2004, included an amendment to claim 7 and added new claims 10-12. The amendment to claim 7 was made to improve the readability of the claim and did not address any statutory issues. The Advisory Action dated June 21, 2004, indicated that these amendments would not be entered.

V. Summary of Invention

One embodiment of the present invention is directed to an energy recovery matrix display driver circuit for generating a voltage Vc having a periodically changing polarity across a capacitive load CL. *See* Fig. 3 and the corresponding discussion at page 9, lines 4-15. The driver circuit includes an inductor L1 coupled to the capacitive load. There is a first switch S1 for creating, during a resonance period Tr, a resonant circuit including the inductor and the capacitive load to change the voltage from a first polarity to a second polarity and a second switch S2 for coupling, after the resonance period, the capacitive load to a power supply voltage Vcc having the second polarity. Connected in parallel with the inductor is a switch circuit (S3, D3, S6, D9) for circulating a current IL1 through the inductor in a loop formed by the switch circuit and the inductor where the loop is closed not later than an instant at which the current changes polarity at the end of the resonance period. Also, a control circuit CC for controlling the first switch, the second switch, and the switch circuit to periodically open and close is included.

Another embodiment is directed to a matrix display apparatus including a matrix display panel with a matrix of pixels associated with intersecting electrodes and an energy recovery matrix display driver circuit for generating a voltage having a periodically changing polarity across a capacitive load. The driver circuit includes an inductor L1, a first S1 and

second S2 switch, a switch circuit (S3, D3, S6, D9), and a control circuit CC as discussed above.

Another embodiment is directed to an energy recovery matrix display driver circuit for generating a voltage having a periodically changing polarity across a capacitive load. *See* Fig. 3 as discussed above and the corresponding discussion at page 9, lines 4-15. The driver circuit includes an inductor coupled to the capacitive load and a first switch for creating during a resonance period, a resonant circuit including both the inductor and the capacitive load to change the voltage from a first polarity to a second polarity. There is a first current path including at least one diode and a second switch for passing current after the resonance period from a power supply voltage having the second polarity to the capacitive load. A second current path includes at least one diode and an additional switch for selectively passing current from the capacitive load to a common node N_j having the first polarity. There is a switch circuit connected in parallel with the inductor for circulating a current through the inductor in a loop formed by said switch circuit and said inductor the loop being closed not later than an instant at which the current changes polarity at the end of the resonance period. Also there is a control circuit for controlling the first switch, the second switch, the additional switch, and the switch circuit to periodically open and close.

VI. Grounds of Rejection

A. Claims 1-5 are rejected under 35 U.S.C. § 103(a) over Weber et al. (U.S. Patent No. 4,866,349) and further in view of Lo (U.S. Patent No. 6,483,490).

B. Claims 6-9 are rejected under 35 U.S.C. § 103(a) over Moon (U.S. Patent No. 6,111,556) and further in view of Lo.

VII. Argument

Both of the Examiner's proposed combinations of references fail to satisfy the requirements of a *prima facie* Section 103(a) rejection. In both instances, the proposed combinations of references would undermine the operation and purpose of the primary reference ('349 and '556 reference respectively). The MPEP states that when a proposed modification would render the teachings being modified unsatisfactory for their intended purpose, there is no suggestion or motivation to make the proposed modification under 35

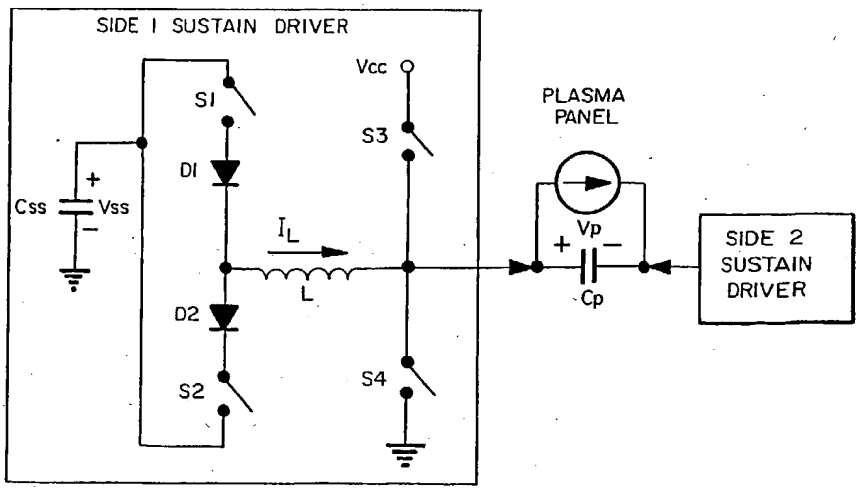
U.S.C. § 103(a). *See* MPEP § 2143.01. Without a presentation of evidence of suggestion or motivation to make the proposed modifications/combinations, the Section 103(a) rejections are improper and cannot be maintained.

A. The rejection of claims 1-5 is improper because the proposed modification of the '349 reference with the teachings of the '490 reference would undermine the operation and purpose of the '349 reference.

The Examiner proposes modifying the '349 reference to include a switch circuit taught by the '490 reference to overcome deficiencies in the '349 reference. However, the Examiner is not clear as to what aspects of the '490 switch circuit (Fig.7) are to be added, *e.g.*, the first switch 708 by itself or the first switch 708 including the capacitor C2. With or without the capacitor C2, Appellant submits that either configuration when combined with the '349 teachings would undermine the purpose or operation of the '349 teachings.

The '349 reference is directed to reducing the cost of manufacturing plasma panels including reducing the number of components in the production of the plasma panels. *See* column 2, lines 11-24. The '349 reference teaches recirculating energy using an inductor with a reduced cost and reduced components. In order to facilitate discussion of the Examiner's proposed modification, included below is Fig. 5 of the '349 reference showing the circuit the Examiner proposes modifying.

FIG.5



This '349 circuit is designed to use an inductor to provide energy recovery for a plasma display panel. *See* column 2, lines 51-54. Excitation of a resonance between the

inductor and parasitics during switching associated with current reversal through the inductor creates unwanted electro-magnetic interference. *See* column 11, lines 28-32.

To illustrate the Examiner's proposed modification of the '349 circuit, below is the left half of the '490 Fig. 7, showing an example of the '490 switch that the Examiner proposes inserting in the '349 circuit (with or without the capacitor).

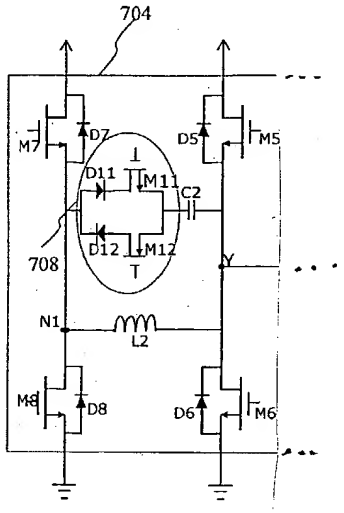


FIG. 7

This '490 switch circuit includes diodes, transistors, and a capacitor across an inductor with the circuit to extract energy from the inductor. *See* column 6, lines 56-60. Thus, the '490 reference teaches away from keeping energy stored in the inductor, and would generally exacerbate the electro-magnetic interference created in the '349 circuit due to the inductor.

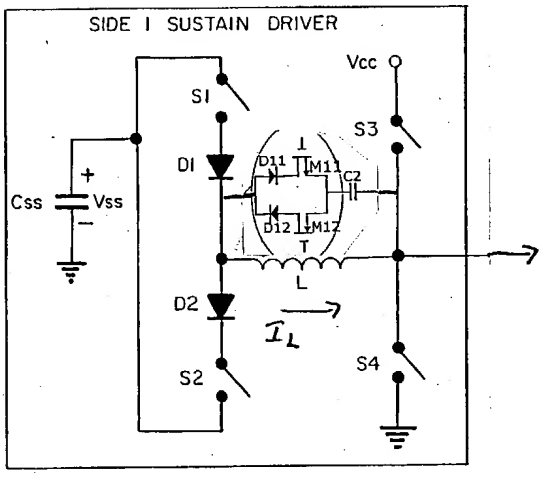
If the Examiner's proposal is to add both the switch and the capacitor of the '490 teachings, then the switch must be properly controlled to achieve some unspecified purpose; this purpose, however, would still result in the '490 capacitor retaining some of the energy sent to the plasma panel. Consequently, this implementation would diminish the brightness of the display. *See* '349 reference, column 2, lines 19-21. Further, the proposed modification includes no control or rules for opening and closing the switch. Thus, if the switch is opened, always or at disadvantageous times, no current passes and the Examiner's proposal is illegal; and if the switch is closed, always or at disadvantageous times, then the switch provides no purpose whatsoever and renders the proposed modified switch circuit inoperable. The addition of these extra components also directly contradicts the stated objective of the '349 reference to reduce cost and components in the plasma panel.

If the Examiner proposes to merely add the '490 switch without the accompanying capacitor, then the Examiner's proposed design would be inoperable. Without the capacitor, the '490 switch would not circulate energy because there would be no resonance. Further, as discussed above, there would be no control over the switch to turn the switch on or off. Moreover, as discussed above, the proposed modification of the '349 reference would undermine the operation of the '349 plasma panel and would defeat the purpose of reducing cost and component count.

Below are hypothetical drawings of the Examiner's proposed, modified circuit. The drawing on the left includes both the switch and the capacitor and the drawing on the right includes only the switch.

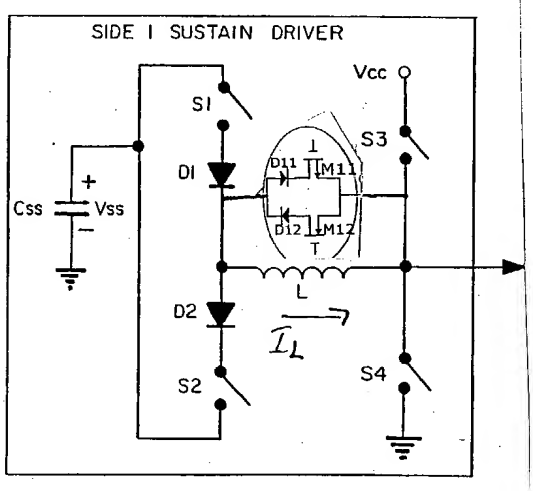
With

FIG.5



Without

FIG.5



As discussed above and illustrated in these hypothetical drawings, the Examiner's proposed modification of the '349 circuit would render the circuit inoperable because the additional switch circuit (with or without the capacitor) disrupts the energy flow to the plasma panel. The presence of the capacitor detains some of the energy that would otherwise be transmitted to the panel, therefore diminishing the brightness of the display. The presence of the switch interrupts the timing of the switching of the '349 circuit and would short out the inductor when current is flowing. Regardless of which components the Examiner proposes adding to the '349 circuit, the proposed modified '349 circuit would be inoperable and would undermine the objectives of the '349 teachings.

Moreover, the Examiner fails to show how the '490 current switch (or combined art) would switch polarity at the end of a resonant cycle and how a resonant period ends when the current changes polarity, as claimed. Rather than supporting the Examiner's interpretation, the relevant portions of the '490 reference are directed to routing current in different directions without any switching of polarity; thereby teaching away from the proposed modification. *See e.g.*, column 6, lines 51-55. The Examiner fails to provide evidence that the skilled artisan would be motivated to make the proposed combination. Without a proper presentation of evidence of motivation, the Section 103(a) rejection should be reversed.

B. The rejection of claims 6-9 is improper because the proposed modification of the '556 reference with the teachings of the '490 reference would undermine the operation and purpose of the '556 reference.

Similar to the above discussion, the proposed modification of the '556 reference with the '490 switch circuit would undermine the purpose and operation of the '556 reference. The '556 reference also uses an inductor I_L of Figs. 1 and 3 in the same manner as the '349 reference. *Compare* Figs. 1 and 3 of the '556 reference with Fig. 5 of the '349 reference. Both of the circuits relied upon in the final Office Action, Figs. 1 or 3 of the '556 reference and Fig. 5 of the '349 reference, are the same. Thus, each of the above arguments, except for those regarding a reduced component count, is applicable to the rejection of claims 6-9.

The following arguments parallel those discussed above with respect to the operational purpose of both of the '349 and '556 references.

The Examiner proposes modifying the '556 teachings to include a switch circuit taught by the '490 reference to overcome deficiencies in the '556 teachings. However, the Examiner is not clear as to what aspects of the '490 switch circuit (Fig.7) are to be added, *e.g.*, the first switch 708 by itself or the first switch 708 including the capacitor C2. With or without the capacitor C2, Appellant submits that either configuration when combined with the '556 teachings would undermine the purpose or operation of the '556 teachings.

The '556 circuit is designed to use an inductor to provide energy recovery for a plasma display panel. *See* column 6, line 66 – column 7, line 3. Excitation of a resonance between the inductor and parasitic capacitance during switching associated with current reversal

through the inductor creates unwanted electro-magnetic interference. *See* column 10, lines 6-12.

Again, the '490 switch circuit includes diodes, transistors, and a capacitor across an inductor with the circuit to extract energy from the inductor. *See* column 6, lines 56-60. Thus, the '490 reference teaches away from keeping energy stored in the inductor, and would generally exacerbate the electro-magnetic interference created in the '556 circuit due to the inductor.

If the Examiner's proposal is to add both the switch and the capacitor of the '490 teachings, then the switch must be properly controlled to achieve some unspecified purpose; this purpose, however, would still result in the '490 capacitor retaining some of the energy sent to the plasma panel. Consequently, this implementation would diminish the brightness of the display. *See* '556 reference, column 2, lines 19-21. Further, the proposed modification includes no control or rules for opening and closing the switch. Thus, if the switch is opened always or at disadvantageous times, no current passes and the Examiner's proposal is illegal; and if the switch is closed always or at disadvantageous times, then the switch provides no purpose whatsoever and renders the proposed modified switch circuit inoperable.

If the Examiner proposes to merely add the '490 switch without the accompanying capacitor, then the Examiner's proposed design would be inoperable. Without the capacitor, the '490 switch would not circulate energy because there would be no resonance. Further, as discussed above, there would be no control over the switch to turn the switch on or off. Moreover, as discussed above, the proposed modification of the '556 reference would undermine the operation of the '556 plasma panel.

As discussed above, the Examiner's proposed modification of the '556 circuit would render the circuit inoperable because the additional switch circuit (with or without the capacitor) disrupts the energy flow to the plasma panel. The presence of the capacitor detains some of the energy that would otherwise be transmitted to the panel, therefore diminishing the brightness of the display. The presence of the switch interrupts the timing of the switching of the '556 circuit and would short out the inductor when current is flowing. Regardless of which components the Examiner proposes adding to the '556 circuit, the proposed modified '556 circuit would be inoperable; thereby undermining the operational objectives of the '556 teachings.

Moreover, the Examiner fails to show how the '490 current switch (or combined art) would switch polarity at the end of a resonant cycle and how a resonant period ends when the current changes polarity, as claimed. Rather than supporting the Examiner's interpretation, the relevant portions of the '490 reference are directed to routing current in different directions without any switching of polarity; thereby teaching away from the proposed modification. *See e.g.,* column 6, lines 51-55. The Examiner fails to provide evidence that the skilled artisan would be motivated to make the proposed combination. Without a proper presentation of evidence of motivation, the Section 103(a) rejection should be reversed.

VIII. Conclusion

In view of the above, Appellant submits that the rejections are improper, the claimed invention is patentable, and that the rejections of claims 1-9 should be reversed. Appellant respectfully requests reversal of the rejections as applied to the appealed claims and allowance of the entire application.

Authority to charge the undersigned's deposit account was provided on the first page of this brief.

Should there be any remaining issues that could be addressed over the telephone, the Examiner is asked to contact the agent overseeing the application file, Mr. Eric Bram, of Philips Corporation at (914) 945-6000.

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By: _____
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APPENDIX OF APPEALED CLAIMS FOR APPLICATION NO. 09/932,085

1. (previously presented) An energy recovery matrix display driver circuit for generating a voltage having a periodically changing polarity across a capacitive load, said driver circuit comprising:

an inductor being coupled to the capacitive load,

a first switch for creating, during a resonance period, a resonant circuit including the inductor and the capacitive load to change said voltage from a first polarity to a second polarity, and a second switch for coupling, after the resonance period, the capacitive load to a power supply voltage having the second polarity,

a switch circuit connected in parallel with the inductor for circulating a current through the inductor in a loop formed by said switch circuit and said inductor, said loop being closed not later than an instant at which said current changes polarity at the end of the resonance period, and

a control circuit for controlling the first switch, the second switch, and the switch circuit to periodically open and close.

2. (previously presented) An energy recovery matrix display driver circuit as claimed in claim 1, wherein the switch circuit comprises a series arrangement of a diode and a controlled switch, said series arrangement being connected in parallel with the inductor, said controlled switch being closed not later than the instant at which said current changes polarity at the end of the resonance period, said diode being poled to conduct said current after it has changed polarity.

3. (previously presented) An energy recovery matrix display driver circuit as claimed in claim 2, wherein the switch circuit further comprises a series arrangement of a further diode and a further controlled switch, said further series arrangement being connected in parallel with the inductor, said further controlled switch being closed not later than an instant at which said current changes polarity at the end of a further resonance period in which the voltage across the capacitive load changes polarity in an opposite direction with respect to the first-mentioned resonance period, said further diode being oppositely poled with respect to the first-mentioned diode.

4. (previously presented) An energy recovery matrix display driver circuit as claimed in claim 1, wherein the control circuit is adapted to close the second switch after the instant at which said loop is closed.

5. (previously presented) A matrix display apparatus comprising a matrix display panel with a matrix of pixels associated with intersecting electrodes, and an energy recovery matrix display driver circuit for generating a voltage having a periodically changing polarity across a capacitive load, said driver circuit comprising:

an inductor being coupled to the capacitive load,

a first switch for creating, during a resonance period, a resonant circuit including the inductor and the capacitive load to change said voltage from a first polarity to a second polarity, and a second switch for coupling, after the resonance period, the capacitive load to a power supply voltage having the second polarity,

a switch circuit connected in parallel with the inductor for circulating a current through the inductor in a loop formed by said switch circuit and said inductor, said loop being closed not later than an instant at which said current changes polarity at the end of the resonance period, and

a control circuit for controlling the first switch, the second switch, and the switch circuit to periodically open and close.

6. (previously presented) An energy recovery matrix display driver circuit for generating a voltage having a periodically changing polarity across a capacitive load, said driver circuit

comprising:

an inductor being coupled to the capacitive load;

a first switch for creating, during a resonance period, a resonant circuit including the inductor and the capacitive load to change said voltage from a first polarity to a second polarity;

a first current path, including at least one diode and a second switch, for passing current, after the resonance period, from a power supply voltage having the second polarity to the capacitive load;

a second current path, including at least one diode and an additional switch, for selectively passing current from the capacitive load to a common node having the first polarity;

a switch circuit connected in parallel with the inductor for circulating a current through the inductor in a loop formed by said switch circuit and said inductor, said loop being closed not later than an instant at which said current changes polarity at the end of the resonance period; and

a control circuit for controlling the first switch, the second switch, the additional switch and the switch circuit to periodically open and close.

7. (previously presented) An energy recovery matrix display driver circuit as claimed in claim 6, further including a common node shared by each of the inductor, the capacitive load, the first current path, and the second current path.

8. (previously presented) An energy recovery matrix display driver circuit as claimed in claim 6, wherein the control circuit is adapted for controlling the switch circuit in order to limit electro-magnetic interference.

9. (previously presented) An energy recovery matrix display driver circuit as claimed in claim 6, wherein the control circuit is adapted for controlling the switch circuit in order to limit the circulating current.

APPENDIX OF EVIDENCE FOR APPLICATION NO. 09/932,085

Appellant is unaware of any evidence submitted in this application pursuant to 37 C.F.R. §§ 1.130, 1.131, and 1.132.

APPENDIX OF RELATED PROCEEDINGS FOR APPLICATION NO. 09/932,085

As stated in Section II above, Appellant is unaware of any related appeals, interferences or judicial proceedings.